

-12-

CLAIMS:

1. A method for mixing fluidized particles with a fluid hydrocarbon feed stream in a feed injection zone of a fluid catalytic cracker which comprises:

- (a) passing fluidized particles to a particle conduit;
- (b) conducting the fluidized particles from the particle conduit to the feed injection zone containing a non-circular conduit provided that the particle conduit and the non-circular conduit have a substantially uniform cross-sectional area; and
- (c) injecting fluid hydrocarbon feed into the feed injection zone through a plurality of feed injectors located upon said non-circular conduit.

2. The method of any preceding claim wherein the non-circular conduit is ellipsoidal, rectangular, square or two parallel sides with semi-circular or ellipsoidal ends.

3. The method of any preceding claim wherein the non-circular is ellipsoidal.

4. The method of any preceding claim wherein the non-circular conduit is rectangular.

5. The method of any preceding claim wherein the feed injectors are arranged in a plane perpendicular to the direction of axial flow of catalyst in the injection zone.

6. The method of any preceding claim wherein the feed injectors are injector nozzles.

-13-

7. The method of any preceding claim wherein the direction of flow from the feed nozzle is perpendicular (90 degrees) to the axial flow of catalyst.
8. The method of any preceding claim wherein the feed injector nozzles at angles of from 20 to 90 degrees in the direction of flow.
9. The method of any preceding claim wherein the feed injection zone has optimal penetration of feed.
10. The method of any preceding claim wherein the feed injected into the feed injection zone has a penetration equal to $0.33D_{\text{effective}}$.